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October, 1902.

THE AMERICAN

X-RAY JOURNAL

A MONTHLY
DEVOTED
TO THE
PRACTICAL
APPLICATION
OF THE
NEW SCIENCE
AND TO THE
PHYSICAL
IMPROVEMENT
OF MAN.

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THE AMERICAN X-RAY JOURNAL

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Secretary of The American Electro-Therapeutic Association.

THE AMERICAN X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. XI.

ST. LOUIS AND CHICAGO, OCTOBER, 1902.

No. 4.

PUBLISHER'S ANNOUNCEMENT.

THE AMERICAN X-RAY JOURNAL will devote its columns to the education of the medical profession in X-Ray and Electro-Therapeutical Practice.

This includes (a) X-Ray Diagnosis, both medical and surgical, the methods of fluoroscopic and photographic examination, of locating fractures and dislocations, renal and hepatic calculi, aneurisms, abnormal conditions of the heart, tumors, tubercular diseases, malformations, etc.

(b) X-Ray Therapy, treatment of cancer, tuberculosis, diseases of the skin, etc., etc.

(c) Electro-Therapy of acute and chronic diseases as follows: Mental and nervous; diseases of the heart, lungs, eye, ear, nose and throat; gynecology, obstetrics, genito-urinary diseases, diseases of children; skin, liver, kidney, rectal and intestinal disorders.

(d) Dental diagnosis and treatment.

X-Ray and Electro-Physics, insofar as they directly concern the physician and surgeon, will receive their full share of attention.

As far as practicable, each number of the Journal will contain articles in each of the following departments:

1. Scientific and original articles for advanced workers.

2. Clinical reports of x-ray therapy and electro-therapy. Every physician, no matter what school he belongs to, is invited to send for publication reports of his cases treated with the x-ray or electricity, not exceeding two hundred words. State exactly what you did, how you did it, and

the results, and the Journal will be glad to give you the space.

3. Editorial News and Notes, giving the latest news in x-ray and electro-therapeutics from all parts of the world.

4. Queries answered by well-known specialists.

5. Lessons for Beginners, a complete course, consisting of 24 lessons, under the auspices of The Chicago College of X-Ray and Electro-Therapeutics, on the principles and practice of x-ray and electro-therapeutics. No physician can afford to miss this course. It is worth \$100 to any practitioner.

We will expose fraud and charlatanism wherever we find it, and will exercise the utmost care to see that everything that enters the pages of the Journal is thoroughly reliable. Truth is what we seek and truth we welcome from every source, giving credit where credit is due, without fear or favor.

The Journal will be enlarged as rapidly as necessary to meet all requirements. The subscription price will remain the same as heretofore; \$3.00 per year in the United States, Canada and Mexico; \$4 in foreign countries. Single copies, 50 cents.

SPECIAL NOTICE.

We are in receipt of numerous enquiries asking us to recommend physicians in various parts, who are competent to use electricity and the x-ray.

We propose to reserve space in our advertising pages for cards of those we know to be competent. For conditions and terms address the publishers.

The Treatment of Urethral Stricture by Electrolysis.

BY ROBERT NEWMAN, M. D.

Ex-President American Electro-Therapeutic Association,
Consulting Physician to the Home at Yonkers,
New York; Consulting Surgeon to
Hackensack Hospital, etc.

The treatment described below has been successfully used by me in more than two thousand cases during the last thirty-three years, and I have not lost a single case by death from this treatment. Many of these patients have been kept under observation for years and re-examined from

it is an organic stricture of the urethra, to the exclusion of a spasm of the bladder or any other disease of the bladder, prostate or urethra. In any other acute disease, inflammation, hemorrhage, or discharge, electrolysis is contra-indicated. The topography of the urethra should first be well ascertained, the strictures measured, and a plan for the operation made out accordingly, with a full knowledge of what it is intended to accomplish. The posture which the patient assumes during the operation is immaterial. Anesthetics are not



BOUGIE A BOULE.

time to time, and in no case has a relapse been found. The treatment is painless, relief is immediate, and the patient is not prevented from attending to his ordinary business.

Strictures are of two types: (1) Spasmodic, and (2) Organic. Organic stricture may consist of slight pathological changes in the mucous lining only, for which gentle dilatation is the ideal treatment. But in my experience most cases of organic stricture were found to be infiltrations of sub-

used, as no pain should be caused, and the patient ought to be conscious so that he can express his sensations.

The exploration of the urethra is made with a bougie a boule, of whalebone, of the proper size, with an olive-shaped head and slender neck.

Four sets of electrodes have been devised by the writer, namely:

1. *The Egg-Shaped Set.*—These are the regular electrodes for all ordinary cases, have a short curve, an egg-shaped



THE EGG-SHAPED ELECTRODE.

mucous tissues, spread in a circle, deep-seated more or less thruout all tissues except the foreskin. This causes fibrous formations and cicatrices, which infringe slowly but steadily on the caliber of the urethra from the outside, and sometimes form even abscesses. Such strictures can not be expected to yield to the different surgical means, and the infiltrated tissue can only be cured by absorption.

The diagnosis is most important. It must be established without any doubt that

metallic bulb at the working end, while at the upper end there is a round wire rod for the binding screw of the negative pole of the battery. These are the only points not insulated and act as conductors for these extremities. The rest of the electrode must be well insulated, smooth, and without inequalities. A conical bulb is objectionable in most cases, as we depend on the electrolytic power of absorption, not on force. The length of the bulb is proportioned to the size of the electrode;

thus, for No. 11 French the bulb is 3-16 of an inch, while for No. 21 it is 3-8 of an inch. The set consists of Nos. 11, 14, 17, 18, 20, 21, 23, 25, 28 of the French scale.

2. *The Acorn Set.*—These are for use in the first six inches of the urethra in certain cases, and consist of Nos. 15, 17,

18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. When the strictures are tortuous these electrodes are safer, and false passages are impossible.

4. *The Combination Electrode.*—This is a tunneled electrode, combined with a catheter. When a very tight stricture is complicated with retention of urine, the indications are to remove the obstruction



THE ACORN ELECTRODE.

20, 22, 25, 27, French. They are without a curve, short, and the bulb is acorn-shaped. Sometimes it is desirable to gain ground by entering the contraction first with the point of the electrode, in order to follow easier with the larger part of the acorn; here this form will do good work. The action of the electrolysis de-

pends on the largest diameter of the bulb in these cases, and does most service on the withdrawal of the electrode when the operator feels best how much work should be done. They are also used when the stricture is near the meatus. They are six inches long, and thereby avoid the temptation to pass the instrument deeper into



THE TUNNEL ELECTRODE.

pend on the largest diameter of the bulb in these cases, and does most service on the withdrawal of the electrode when the operator feels best how much work should be done. They are also used when the stricture is near the meatus. They are six inches long, and thereby avoid the temptation to pass the instrument deeper into

ter in the bladder, so that this organ can regain its muscular action.

The bulbs of all electrodes are just as large as the size they represent; not conical at the end, as the sounds are which are usually sold. This makes a difference of from six to eight numbers between Newman electrodes and the shop instru-



THE COMBINATION ELECTRODE.

the prostatic part of the urethra when such introduction is not needed.

3. *The Tunneled Electrode.*—These are in Nos. 9, 11, 14, 17, 20, 21, French. They are very important for bad, tortuous strictures, and are to be used only by the expert operator. The curve is shorter, and the egg-shaped bulb tunneled so that it may be introduced over a fili-

ments, in which the number is expressed by the size at the shaft.

For ordinary strictures, the size of the bougie selected should be two or three numbers (French) larger than the stricture. Since my method has become popular, some instrument makers have sold an inferior and faulty article by the thousand, and very cheap. Some have even manu-

factured at random instruments which they sell as Newman's electrodes, for which I am not responsible, and deny most emphatically the parentage. I have seen many defective instruments with which nobody could perform the operation correctly. Electrodes in which the metal bulb is screwed to the stem are always dangerous, and should never be manufactured.

Any good galvanic battery of twenty or more cells can be used for the work. A milliamperemeter is necessary; whether a rheostat or controller alters the action of the electrolysis is a mooted question.*

Examine the battery carefully, test the poles, and be sure that everything is in working order. Connect the electrode with the binding post of the negative pole of the battery, as only the negative electrode (kathode) must be used to the stricture, which causes a chemical galvanic absorption, attracting the alkalies and the hydrogen. The electrode must be lubricated with glycerine and introduced into the urethra until the bulb is arrested by the stricture. A pad electrode wet with warm (salty) water and connected with the positive pole of the battery completes the electric circuit. This positive electrode (anode) is best held by the patient firmly in the palm of his hand, but may be pressed against any other part of the cutaneous surface of the body. While both poles are held in this manner the galvanic current is slowly and gradually increased, one cell at a time, until the patient feels a warm and slightly pricking sensation. The strength of the current must be from two to five milliamperes. The writer uses not more than five milliamperes, but under some circum-

stances accomplishes all he wants with two or two and one-half milliamperes.

At this time comes the most important part of the operation, the guiding of the electrode, which must be held steady but gently against the stricture. Under no circumstance must pressure be used. The absorption must take place entirely by electrolysis. The stricture yields, is enlarged, the electrode slowly advances, passes the obstruction, and sometimes will fairly jump through the stricture. If there are more strictures than one, the electrode should be guided through each in the same way until it enters the bladder. Then slowly in the same manner withdraw the electrode, pause a little at each stricture, for another dose of absorption, till the first stricture—nearest the meatus—has been repassed, when the current is again to be reduced, slowly, cell by cell, to zero, and not until then is the electrode to be removed. During the whole operation the electrode must be held against the obstruction, all pressure or force being avoided. Any dilatation by pressure or any force is a mistake; the bougie will take care of itself, doing its work by the electrolytic action of the current. A seance may last from five to twenty minutes. The average is about ten minutes. Then the urethra should be left alone, and under no circumstances a sound used.

An antiseptic irrigation of the urethra may be used before the operation—in fact, some patients expect it. The seance should be repeated at intervals of one week, each time using an electrode two or three numbers larger than the last one used. On the average the cure of a stricture takes about two months.

As some physicians who are unfamiliar with the technique of electrolytic operations have reported failures in their attempts to relieve stricture by this method, I call attention to the essential conditions of success.

1. Correct diagnosis. Spasmodic stric-

*I do not like to use a rheostat, which converts the whole number of cells into *one* cell, thereby making a different action of electrolysis. This is a mooted question, and not according to rules of the general electrician nor ohm's law, which I admit. However, from experience and results, I have come to the conclusion that the electrolysis is harsh and different with a rheostat than without it—using only full cells—augmenting by one cell only at the time, beginning at zero, increasing and decreasing by degrees of *one* cell only.

To prove this, elaborate experiments in a laboratory would be necessary. I can speak only from practical experience.

ture and all acute inflammatory conditions of the urethra are made worse by this treatment.

2. Correct current strength. Less than two milliamperes will rarely be found effective. More than five or six milliamperes may cauterize; and so re-induce the condition it is sought to cure.

3. Use of the kathode or negative electrode in the urethra. The anode would make matters worse than before.

4. Electrodes of the proper size, shape and material.

5. Proper duration and interval of seances; five to twenty minutes about once a week.

6. Avoidance of force and all forms of irritation, whether mechanical, electrical, or chemical.

Numberless reports of successful treatment by this method have been given. Failures are due to non-observance of these rules. All organic strictures are amenable to this treatment.

It must and will succeed in proper hands in every case that is intelligently and judiciously undertaken. The operation itself needs a clear head, a steady hand, fingers which both see and feel, patience and combined expertness of the electrotherapeutic and genito-urinary surgeon.

For the positive electrode use carbon or zinc, covered with absorbent cotton saturated with water, or a warm solution of common salt; * if preferred, and apply firmly to the cutaneous surface of the patient's hand, thigh, or abdomen.

The negative electrodes are firm sounds, insulated with a mass of hard-baked rubber. The extremity is a bulb, which is the acting part in contact with the stricture. Four varieties are now in use, as described above. The curve of the electrode should

be short; large curves are mistakes. The electrodes must not be lubricated with any non-conducting substance.

THE ADVANTAGES OF ELECTROLYSIS.

1. Electrolysis is applicable to all organic strictures in any part of the urethra.

2. Electrolysis will pass and enlarge any stricture, when other instruments or the skill of the surgeon fails.

3. It causes no pain or inconvenience.

4. It is devoid of danger.

5. It is not followed by hemorrhage, fever, or any other unpleasant consequences.

6. It relieves at once.

7. The patient is not prevented from attending his daily work or business, and can earn his living while under treatment, without restraint.

8. No relapse takes place.

The spasmodic stricture, which is described by writers in most of the textbooks, is an unfortunate misnomer.

A stricture is a permanent pathological condition, by which the caliber is smaller than in the normal state. The name ought to be descriptive of the condition, and therefore, the expression "spasmodic" stricture misleads most medical men in conception, diagnosis and treatment. A spasm is a temporary action, dependent on other and entirely different causes and should not be called a stricture. In reality this is a vesical tenesmus, which in most cases is dependent on the muscular contraction of the bladder, which at different times may be more or less, according to the causative actions. Hence the definition of an organic stricture should be "a permanent narrowing of the caliber of the normal urethra, which either exists in the urethra itself, or in the tissues surrounding the canal." Violent spasm may be caused by complications, or some other primary causes, which are then simultaneous with the organic stricture, in which case each disturbance needs a different treatment. Therefore it might be, that the organic

* For the indifferent positive pole I use a pad electrode moistened with hot water. I do not use salt because it increases the current (amperage) to such a degree, that I cannot control it, thereby acting too much in decomposition, and cauterizing instead of absorbing. The salt also oxidizes the pad and its base of metal or carbon. As I use not more than five milliamperes, I can control the current better without the use of salt.

stricture of the urethra must be treated by the galvanic current, while the spasms of the bladder need a Faradic application.

Treatment.—The question naturally arises, what different treatment must be pursued in the two different conditions. A correct diagnosis is of first importance, and next the causes of the disease must be determined. Then the following rule will guide the operator:

An organic stricture must be treated as advised and described in this article. Electrolysis, which can only be produced with a galvanic battery, will cure that stricture by absorption; but the same procedure will aggravate any spasmodic action. The practical fact is, that the electrode with a galvanic current is impassable through a temporary spasm.

The spasmodic stricture is passable and must be cured by a Faradic (alternating) current, which is more effective if such Faradic current is applied with a high tension apparatus, which, of course, is a Faradic current. The high tension machine of the Jerome Kidder Mfg. Co. has served the writer best. The technique and electrodes are the same as used for an organic stricture. Medical measures may be used in addition as indicated by symptoms.

Never forget the rule:

Use the galvanic current for the organic stricture. Use the Faradic (alternating) current for spasm, or as it is called, the spasmodic stricture.

101 W. 80TH STREET, NEW YORK.

Electricity in Bright's Disease.—Rockwell finds that electricity is of advantage in Bright's disease, though it can not be shown that it affects the waxy or cirrhotic kidneys. Its action on simple hyperemia, acute inflammatory affections and many passive congestions is especially mentioned. The most useful currents are the high tension faradic current and the so-called static wave current.

Melano Sarcoma of the Eye Treated With the X-Ray.

BY J. E. HARPER, M. D.

(Read before the Chicago Electro-Medical Society at its September meeting, 1901.)

Mrs. M. Hendricks, married, aged 23 years, was admitted to the Illinois Charitable Eye and Ear Infirmary Dec. 2, 1901. Examination revealed a dark colored growth on the sclera of the right eye. The growth was about 5 mm. in diameter and extended outward from the limbus of the cornea, the lower edge reaching below the horizontal meridian. The patient stated that she first noticed, about a year before, a small dark spot which steadily grew until it had reached its present size. She had experienced some pain in this portion of the eye from time to time, but the pain was never severe. The cornea, iris and ciliary body were apparently not involved. Vision was normal.

Dr. W. H. Peck removed a piece of the growth and this was examined microscopically by Drs. Wilder and Brown of the infirmary staff. A positive diagnosis of melano sarcoma was made and after consultation enucleation was advised. A few days later the case was shown to the members of the Chicago Ophthalmological Society and the diagnosis and treatment confirmed.

I first saw the case on Dec. 9, 1901, and one week later operated by cutting away the growth very carefully and scraping the sclera beneath until forced to desist for fear of exposing the ciliary body. The wound was closed by stitching the conjunctiva over it and antiseptic dressings were ordered. One week later the wound had healed nicely and only slight hyperemia remained. Three small dark spots (foci of cancerous pigmentation) were visible. It having been decided that it was safe to try the x-ray in preventing a recurrence the case was turned over to Dr. H. P. Pratt. The area formerly occupied by the growth was daily exposed to the

x-ray for from three to five minutes. No appreciable result was noticed during the first two weeks of treatment. An improved condition was apparent after the first month. Occasionally the patient complained of pruritis and lachrymation. At times the treatment was discontinued for two or three days owing to increase of hyperemia and sensitiveness. The condition of the eye has, in the main, steadily improved and one after the other the dark spots have disappeared until at present there is left only one minute speck showing the location of one of the foci of cancerous pigmentation.

Nine months and a half have passed since the growth was removed, and the present appearance would indicate that there is no likelihood of its return. The improvement under the x-ray treatment has been so pronounced that I am inclined to believe that the condition will eventually be entirely removed.

1101 MASONIC TEMPLE, CHICAGO.

UNNOTICED FRACTURES IN CHILDREN.

F. J. Cotton states that the systematic use of the x-ray has confirmed the suspicion that fractures not infrequently exist with but slight symptoms, that mere cracks may readily be overlooked, that incomplete fractures or complete fractures without displacement are commoner than was formerly supposed, and may exist without being suspected by the patient. Eighteen cases are reported, ten of fracture of the clavicle, three of the bones of the forearm, two of the tibia and three of a metatarsal bone, which illustrate the author's point.

In small children, where there is a history of a fall or other trauma, and especially where the arm or shoulder girdle may be involved, the only safe way seems to be to assume a fracture as probable, till every inch of bone has been gone over carefully.

Practical X-Ray Diagnosis.

Prepared by J. Rudis-Jicinsky, A. M., M. D., M. E.
Cedar Rapids, Ia. Revised by M. U. Dr.
Joseph Hoffman, Vienna, Austria.

A series of A B C teaching for workers in x-ray diagnosis and therapeutics, to be concluded in 20 lessons. Fully illustrated.

LESSON 15.

Leaden Box With Diaphragms.

We are now able to obtain body pictures in less time than formerly, owing to the fact that we have better and more powerful apparatus and that some of our tubes have a device by means of which the vacuum in a tube can be lowered or again raised at will. But the so-called self-regulating tubes on the market are not all perfect and do not give satisfaction always. We have not yet been able to secure a method for keeping the tube at a uniform vacuum, and the fluoroscopic examinations have to be still depended upon in determining the condition of each individual tube, as already stated. Besides we have to shut out the diffused x-rays to get satisfaction in our work. If a low vacuum tube shows the bones of the hand, arm, or leg plainly, the result may be negative if we endeavor to look through the body; and on the other hand with the high vacuum tube we may penetrate the heavy parts of the body, but

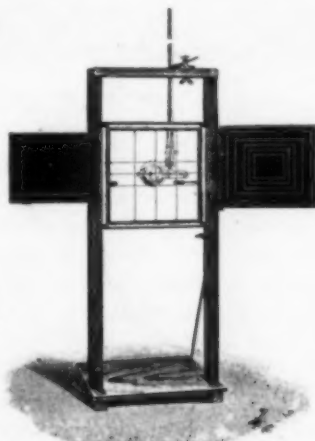


Fig 1. HOFFMAN'S MEASURING STAND.

(Page 1136).

without definition, and all that can be seen is a fussy outline of the bones. In the first case the penetrative power was not sufficient, and in the other too great with a strongly diffused reflection. To select a tube of proper vacuum, increase of definition without lowering the penetration should be our aim.

It is well known that more difficulties are met with in skiagraphing thick bodies than thin ones. A principal reason for this

care must be taken not to illuminate a greater part of the body than appears absolutely necessary to bring the entire plate used under exposure. By imagining the tube to be at a distance of 60 centimeters a hole of only half the size of the plate will be necessary to direct the operating cone of the rays upon the plate with their full effect. According to the instructions of Walter, Kohl, in Chemnitz, Germany, constructed the first leaden box, illustrated

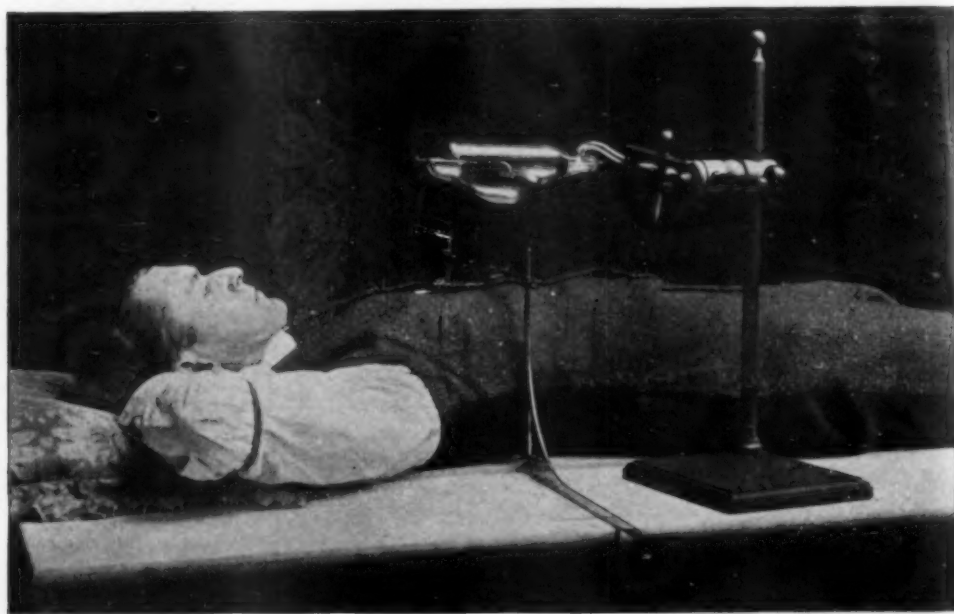


Fig. 5. DENNIS FLUOROMETER, WITH PATIENT IN POSITION.

(Page 1138).

is found in that the x-rays undergo against all substances a strongly diffused reflection, the consequence being that at the corners or edges of an insusceptible substance the rays appear diffuse. This diffused reflection of light is particularly strong in the flesh of a person under operation. From every minute part of the flesh exposed, rays are independently directed upon the plate, and this is the reason that the skiagraphs of the buttock appear with so little contrast. To obviate this evil,

in the annexed Figure 7, which is designed for excluding the detrimental rays. We have used a similar box, but with the addition of a funnel-shaped receiver for our tube.

Tubes of higher exhaustion emit effective rays not only from the platinum plate, but also from the whole tube, these cross the cone of rays emitted from the platinum disk, and those generate shallow pictures. In order to still better keep off these rays we have constructed a receiver

for the whole tube, or better to say for the whole field of radiation of the tube. The description of the box, which nearly every operator can make for himself, is as follows:

The dimensions of such a box are 80x60x30 centimeters. It contains two semi-circular openings sufficiently large to admit a person to lie beneath them. The box is completely lined with sheet lead of 2 millimeters in thickness; a strong and level board is affixed, which forms the bottom, and is also covered with sheet lead of thickness as stated, for keeping off the reflected rays emitted from the operating table. In the lid of the box a square hole is provided of 4 centimeters,

ing screens. The casket is likewise lined with sheet lead for the purpose of making ineffective the reflected rays, therein created.

We have to remember again that a tube to all appearances identical and constructed by the same maker will not always give the same results, and therefore we have to keep on hand a number of tubes supposedly of the same vacuum, and of the same make, so that our work may be conducted thruout under as nearly as possible uniform conditions. That is especially true in the work with a lead box, and heavy subjects.

PART SECOND.

LESSON 16.

The Study of Normal Anatomy.

To the already familiar methods of exploration of the human body in the study of normal anatomy we may now add the revelations and examinations by the x-ray, and in our diagnosis we have to compare always the normal shadows with the abnormal, remembering that a skiagraph can never be taken literally as such alone, and that, to interpret correctly a picture of this kind, we must be in possession of all the accessory facts and factors. The x-ray picture is of undoubted utility as an aid to proper diagnosis and treatment of certain lesions, but can not be depended upon and of itself would not be satisfactory proof in all our cases unless the shadows are verified by careful attention to details, comparison with the normal parts, and consideration of all other methods of practical diagnosis with all the knowledge of each individual case. There still seems to be a feeling among our colleagues that little is to be gained from the routine application of the rays in diagnosis, but the experience of the last few years does not support this opinion, for not only have a number of supposedly different lesions been diagnosed properly, and mistakes made in the



Fig. 7. LEAD BOX. PATIENT IN POSITION.

length and breadth, over which hole the diaphragms of lead with apertures of 15x20 and 20x25 respectively are laid to correspond with the plates 30x40 and 40x50.

In order to keep off the rays from the tube and disk a second diaphragm of lead is provided, placed above the leaden diaphragm of the box, upon wooden supports, the aperture of this diaphragm being sufficiently large not to interfere with the cone or pencil of rays of the platinum-plate. In this work it is better to use doubly prepared plates, or better still, films enclosed in a casket, between two intensify-

usual way corrected, but many lives have been saved from the dreadful results of infection by the probe, many supposedly uncomplicated fractures proven more extensive than anticipated, and many cases found to be of quite a different character from what one would expect to find, judging from the history and physical signs.

We have to know our normal shadows first, before attempting the study of those which seem to represent pathological conditions. The study of normal structures is made easier and more definite by means of this new diagnosis, and the theory that x-ray examinations will finally result in the complete loss of the physician's or surgeon's sense of touch can not stand if we take into consideration how much more is gained by our mistakes and how much more attention we have to give to all details in order to benefit our patients to the greatest possible extent.

With the help of the x-ray we may study the bones, their position, structure, and substance. The relations in the joints can never be understood by artificial arrangements of a skeleton or rigid bodies in the dissecting room. By the x-ray we may see the actual movements and changed positions of bones composing the joints, observe the ligaments and the different layers of muscles in the living body. We may show in our skiagraphs the entire skeleton of an infant, observe the growth of bones, study the epiphyseal lines between the shafts of bones and make out the sensitiveness of the rays to the presence of any earthy salts in the cartilages, thus enabling us to show the very earliest beginnings of ossification in embryo, to the period of birth, and further in life. Cartilage is practically transparent to the rays. In this way we may find out that the ossification takes place a little earlier than our standard text-books state, and the detection is done before the knife and the naked eye could ever do it.

In teaching the anatomy of the move-

ments of the lungs, the heart, the diaphragm, the localization and the size of the different organs, or of hollow organs, as for instance the stomach, intestines, etc., we may take a good skiagraph of a living subject, and to certain extent replace both dissection and vivisection. The picture is taken in a few minutes, and will undoubtedly definitely settle some mooted points in each given case, will show us any deviation in the normal anatomy of certain individuals, and change some of our data, as put down in our rules. If we do not care for or do not need a picture, it is only necessary to take to our help Rollins' "Seehear," a combination of a screen and a stethoscope, having also a sound chamber. This instrument has the advantage in hearing the sounds in the chest of the person examined, while the organs are under inspection with the rays.

Even in the few years which have gone by since the discovery of Professor Roentgen, great progress has been made in x-ray technique so that we can now get skiagraphs which bring out most beautifully the internal structures of the bones, the ligaments, the different layers of muscles, and sometimes even some arteries, as described already in previous lessons. To the comparative anatomist the x-ray furnishes also an opportunity to study in better manner the bony and other structures of the lower animals. In teaching the anatomy of the blood-vessels we may inject the same with a substance opaque to the ray (such as red lead and starch) and thus picture upon the cadaver more accurately to the student the delicate distributions of the arteries and veins with their relationship to the osseous system than by any possible dissection. And sometimes we may find to our astonishment that the course of some normal vessels is not exactly the same in every subject.

As students of anatomy we are familiar with the structures of the bones; a description of these is, therefore, unnecessary.



FIG. 8. SKIAGRAM OF NORMAL CHEST.

Suffice it to say that in normal state on fluoroscopic examination the outline of the shafts must be even, and the marrow cavity show plainly, but when a skiagraph is made it must show the internal structure of the bone in comparative haziness, and this must be symmetrical in every part with the other member on the other side. The negatives are always better, and show more detail. Fluoroscopic inspection is the ocular examination, as we know. Though usually secondary in importance to skiagraphy, it should not be lightly regarded, but made always first, for it often furnishes much information respecting the condition of our tube, and gives us more satisfaction in the examinations, of the chest especially. There the shadow of a normal clavicle, for instance, is the best guide for further investigation and comparison. By fluoroscopic examination you recognize changes in the size, form or symmetry of the bones or the cavities of the body in which the different organs are lodged, and in the movements of their walls, during respiration for instance; as regards their size, rythm, frequency, or force, you may study them perfectly. The bones are opaque to the ray, more than the soft tissue, and using the intensifying screen we may exclude the light shadows of the soft tissues altogether on our pictures, if we wish to, or we may reverse the negative into positive, and print the bones in white, instead of black shadows, to get more detail.

The most satisfactory way to do this kind of work, we have found, is to use a little flash powder in a dark room. You have to burn it about eight feet away from your negative, the quantity of powder depending on the density of the plate. But it takes very little. You have to fasten or hold a negative against a dry-plate just as we do in printing—a plate instead of paper—and expose it to the flash light, and develop our plate as usual, or you may expose the negative with your plate

under for about one second, and no more, to the light. But if we are not in a hurry we may use sensitized paper instead of a plate, as stated already in previous chapters.

For osteology the x-rays have therefore an immense value.

The articulations under the ray give us different shadows, according to the various structures forming the joint. By careful manipulations, remembering the transparency of cartilages, we may get the shadows of ligaments in marked contrast with the bones, and then they show better than the individual layers of the muscles. The movements of the joints are always plain on fluoroscopic examination.

The arteries and veins do not show always, but may show on negatives which have been under-exposed. Their course, relations, and points of entrance from the cavities or near the openings of the bones may be studied in every case. The same with lymphatics and the nerves.

The skin gives us a line of haziness all around our subject on the screen or plate.

A detailed skiagraph of the viscera may be made, especially in children, if we cause distention of the stomach and intestines by some gas, or give the patient food mixed with bismuth subnitrate, or to drink a harmless fluid more or less opaque to the ray—albumen—before the picture is taken. Organs distended with gas allow the rays to pass freely, and thus the record of their location, movement and size is made. In adults Turck's gyromele, recording the size of the stomach or its condition, is still better procedure, giving the chance of skiagraphy, too.

The normal lungs are transparent, but the heart gives a beautiful shadow. The costal and diaphragmatic breathing may be well observed with the help of our fluoroscope, the diaphragm giving a marked shadow. In quiet respiration you will notice the abdominal wall rise with inspiration, and fall with expiration, at the same

time you will observe the lateral expansion of the lower ribs, and slight upward movement of the upper part of the chest, with inspiration, and down with expiration. In this way you may find that the lungs do not fully occupy the thoracic cavity, are not stretched, giving considerable alterations in each individual in the form and movement of the normal chest; and may make out the outline of the aorta in the thorax or other parts, with the anatomy of the trachea, larynx, hyoid bone, etc., when the plate is against the side of the neck. But we have to remember that in about half of the examined normal chests the right apex is not quite so clear as that on the left side, and that the clearness and transparency of the normal lung is much brighter at the end of inspiration. It is the same with the ribs, which are better defined at the moment of inspiration. Therefore before an x-ray examination of the chest ask always for deep, forced inspirations before and during examination to have the proper distention of the lungs. If we wish to study the relation of the trachea and bronchi to the thoracic walls on the cadaver, and demonstrate a picture to a class, it is well to harden our subject with formalin and inject a metallic alloy into the trachea and bronchi.

The relations of the different compartments and orifices of the heart to the chest walls may be made out on x-ray examination, and the whole topography of the heart and aorta studied. The heart and portions of the aorta are distinguished as a dark shadow extending from the first rib to the seventh interspace, and broader below than above. A portion of the aorta gives a light shadow in the first interspace, slightly to the left of the sternum. The auricles give a darker shadow on a line with the third costal cartilages. The right auricle, darker than the ventricle, extends across the sternum, a little beyond its right border. The middle portion of the left auricle may be seen plainly at the cartilage of the third

rib. The right ventricle of a little lighter shadow lies partly behind the sternum, which gives a marked shadow, overlapping the shadow of the heart. The inferior border is on the level with the sixth cartilage, and the left ventricle lies to the left of the sternum, between the third and fifth intercostal spaces. These findings, with the distinctly visible cardiac impulse, in relation to the soft tissues can only be appreciated by examination of the negatives made in such cases. The apex of the heart appears to be invaginated during systole.

When examining we will find to our astonishment, perhaps, that the heart actually descends during inspiration, and the descent of the apex beat is not due—as we were taught before in our schools—to the lifting upward of the thoracic wall over the heart (See the skiagraph, Fig. 2.). When the breath is held the apex beat may vanish, but this is not due to the dilatation of the right ventricle pushing the left aside, but to the lung tissue which occupies the triangular space in front of the heart, causing the apex to go a little deeper and recede from the chest-wall. In old age the aorta may be larger, and the heart lower.

If a person be interposed between your fluoroscope and a Crookes tube, we shall see the beating of the heart, may measure its size, observe its volume and force, and represent all the changes that occur during the cardiac cycle. We may see the rise and fall of the ribs in respiration and the outlines with marked shadows of organs like the liver, spleen, kidneys, the vertebrae and the greater bones. The action of the diaphragm may be well studied in every case, and we may see that during inspiration the same gives dome-like outline, and that the physiologic dictum, that the diaphragm becomes flatter with each inspiration is not correct. Negatives which have been under-exposed, or made under the lead box with lead support and screens,

are always full of delicate, ghost-like, yet clearly defined outlines of skin, muscles, tendons and sometimes veins and arteries, beside the outlines of the organs as stated above. These details are entirely lost in print.

There are difficulties in x-ray examinations of the abdomen which are not met with in similar examinations of the thorax. Here we have more organs together in one cavity of loose walls, their action is not regular and rythmical, and their contents vary. To facilitate our examinations it is well to divide the abdomen into regions, as proposed by Bright, and prefer the plate to the fluoroscope (see lesson 15, Lead Box, etc.), using the fluorometer for measurement and better understanding of our pictures.

The topographical relations of the brain, the frontal and maxillary sinuses and the venous sinuses of the dura mater, the walls of the skull and their relation to the fissure of Rolando, the nasal septa, orbits and all cavities in the head may be made out and photographed. We may superpose on our plate the outline of cranial sutures, the meningeal grooves, the lateral sinuses and their relation to the venous sinuses, and make out the wings of the sphenoidal and the triangular base of implantation of the petrous on the squamous portion of the temporal bone; using this and similar data for the better localization and observation of relationship to convolutions and fissures.

THE KINDERGARTEN OF ELECTROTHERAPY.

BY T. PROCTOR HALL, A. M., PH. D., M. D.

1. Two kinds of currents are obtained from a static electric machine; namely, direct and alternating.

2. The direct current is obtained from the brass balls in front of the machine, one of which is positive, the other negative.

3. The positive pole of the machine is distinguished by the fact that when the end of a pointed stick is placed near it, and a little out of the line of the spark, the spark is deflected to the stick. This does not occur when the stick is near the negative pole.

4. When there are no leyden jars in use, and also when the jars are on but with their outer coatings disconnected, and the sliding rods are several inches apart, two other distinguishing marks are seen.

(a) The spark starts out in a perfectly straight line from the positive pole, and after going a short distance branches out in tree-like form. This branching is less distinct when the jars are in use.

(b) The spark is thicker and whiter a short distance from the negative pole.

5. When the sliding rods are brought closer, so that the small balls are half an inch to one inch apart, the spark has one other character by which the poles are distinguished; namely, at the positive pole the white portion of the spark is longer than the white streak at the negative pole.

6. Between these two positions of the rods, say when the balls are about $1\frac{1}{2}$ inches apart, and at all times when the jars are in use with their outer coats connected, the spark is oscillatory; that is to say, it is a combination of the direct and alternating currents. The oscillatory spark is white over its whole length, and the poles are then usually indistinguishable except by the stick test.

7. The polarity of any static machine may change; more readily when the plates are not perfectly dry.

8. Change of polarity may occur:

(a) When the machine is at rest so long that the plates have entirely lost their charge.

(b) While the machine is in operation with an oscillatory current.

9. Since the sliding rods cannot be opened wide from contact, or closed when

far apart, without, if the machine is running, having the spark pass thru the oscillatory stage; during such opening or closing the polarity may possibly change.

10. The direct current in all cases forms a complete circuit; namely, from the brass ball forming the negative pole, along the rubber-covered rod to the plates of the machine, on the surfaces of the revolving plates to the points of the other rod, thence to the positive pole, and from the positive pole by means of chains, wires, gas or water pipes, the ground, the body of the patient, or the air, to the negative pole.

11. The Positive Electrode, or the Anode, is the extremity of any conductor from the positive pole of the machine.

12. The Negative Electrode, or the Kathode, is the extremity of any conductor from the negative pole.

13. When a patient is to receive the direct current, his body must form part of the electric circuit.

14. If the sliding rods are close together the direct current is completed by the small balls, and no current can reach a patient.

VALUE OF THE ROENTGEN RAY IN SURGERY.

Carl Beck (Medical Record, August 9, 1902) calls attention to this subject in these words, "What a triumph for suffering mankind are the numerous cases in which returned soldiers, contemptuously treated as malingerers before the courts, can now show the skiagraphic proof of the presence of foreign bodies. A patient whose body harbors a bullet has indeed a very good reason to complain. The number of patients who submitted to unnecessary surgical operations because foreign bodies were suspected but not found, and the still larger number of those who were not advised to submit to operation, although needed on account of the non-suspected presence of foreign bodies, is legion."

American Electro-Therapeutic Association.

Twelfth Annual Meeting Held at the Hotel Kaaterskill, N. Y., Sept. 2, 3, 4, 1902, First Day—Tuesday, Sept. 2.

The meeting was called to order in the parlor of the Hotel Kaaterskill, Catskill Mountains, N. Y., by the President, Dr. Fred H. Morse of Melrose, Mass. At the opening executive session twenty-five new members were elected.

Report of Committee on Static Machines and Condensers.—Dr. William James Morton of New York city presented this report. He said the best static machine for therapeutic use is of the Holtz type, while the Wimshurst type is more valuable for x-ray work. He believed that in the near future much better static machines would be constructed, and that a smaller size and higher speed a great desideratum.

Dr. G. Betton Massey of Philadelphia, Pa., objected to a high speed because of the noise, and that a considerable amount of space necessary for proper insulation.

Dr. William B. Snow of New York city that two sorts of machines entirely unnecessary, and suggested that for ordinary work some of the plates might be thrown out of action.

Dr. J. D. Gibson of Birmingham, Ala., that the Toepler-Holtz machine better for x-ray work than the Holtz, though the spark from it is more painful.

The Action and Uses of the X-Rays in Therapeutics.

Dr. Wm. B. Snow, who read this paper, that a static machine having 10 plates whose diameter is from 30 to 34 inches was the best for x-ray work. The effects of the x-rays are markedly chemical. Upon the living tissues the effects are: (1) Diminished nutrition; (2) inflammation; (3) necrosis. The intensity and extent of these effects depend upon (1) the character of the ray; (2) the length of

exposure; (3) the condition of the patient. Pigmentation follows long exposures. The x-rays destroy abnormal tissue elements without seriously injuring the normal tissues unless exposures are too prolonged. Lupus and epithelioma of the skin are invariably cured by the x-ray, especially when combined with the brush discharge from the wooden electrode (anode). No malignant tumor should be operated upon unless followed up by x-ray treatment.

Dr. C. R. Dickson of Toronto had known of x-ray treatment producing diarrhea in cases of internal cancer, just when the destruction of abnormal tissue was most rapid. He favored the brush discharge in all open cases. After tanning, the patient is much less liable to dermatitis from the ray.

Dr. Robt. Reyburn of Washington, D. C., said that the excessive current required in a coil made greater liability to x-ray dermatitis than when the static machine is used.

Dr. J. D. Gibson believed that all chronic inflammations could be improved by the x-ray, and advised its use in hemorrhagic fibroids.

Dr. M. F. Wheatland of Newport reported a case of chronic appendicitis which was benefited by x-ray treatment.

Dr. Francis B. Bishop of Washington, D. C., reported good results from x-ray treatment of tuberculous nodes of the neck, and of fibroid goiter with the brush discharge.

Dr. R. J. Nunn of Savannah thought x-ray burns and constitutional disturbances could be avoided by careful treatment. X-ray burns were produced as often by the static machine as by the coil.

Dr. William James Morton said results were obscured by combined methods of treatment. He saw no reason for expecting different effects from the use of the coil and static machine. The ray

must be sufficiently intense to reach the part to be treated. Superficial cancers, particularly of the face, can almost invariably be cured by the x-ray alone. The treatment should cover a wide area and the position of the tube be changed from time to time. Carcinoma and similar growths in the abdomen do not remain local, hence the difficulty in their treatment. He advocated operation following the x-ray treatment, in order to shorten the cure. A prominent surgeon recently wrote him that he was an absolute pessimist regarding the curability of carcinoma of the breast by operation alone.

Dr. Snow said the character of the ray depended upon the vacuum tube more than upon the source of the electricity. In certain cases he had found that improvement followed the combined treatment, with the x-ray and brush discharge, where the x-ray alone had been unsuccessful.

The Treatment of Cancer by X-Rays.

Dr. Clarence Edward Skinner of New Haven read this paper, which was based on an experience in thirty-three cases. There was complete disappearance of the growth in two cases, permanent reduction in fourteen and permanent arrest in two cases. There was no effect demonstrable on the size of the lesions in fourteen. The general condition of the patient was permanently improved in eleven and temporarily improved in eight cases. A gain in body weight was evident in six, and no influence was apparent in twenty-seven cases. Hemorrhage was lessened in eight cases and uninfluenced in one case. Evidences of systemic toxæmia were noted in fourteen cases. Out of the thirty-three cases there were three apparent cures; thirteen were permanently benefited and were still improving; twelve were temporarily benefited; two were not benefited, and in three the treatment was discontinued too soon to expect any result. Every one of the cases was inoperable and presented a hope-

less prognosis. The three cured cases were as follows: (1) Round-cell sarcoma of the neck of three years' standing; (2) a case of recurrent carcinoma of the right breast with evidence of metastasis in the deep lymphatics of the trunk; (3) a nodulated palpable tumor, probably sarcoma, situated deeply in the lower lumbar and upper sacral regions.

Dr. J. D. Gibson of Birmingham, Ala., said that his experience had been that in superficial cancers the best results were obtained from the use of very soft tubes and close exposures, ranging from seven to ten minutes. In one or two of these cases he had used a high vacuum tube, and while it had caused considerable reaction the cancer did not seem to improve so rapidly as with the soft tube.

Dr. Robinson of Lexington, Ky., said that his experience had been that if there was much involvement of the tissues the soft tubes did not give such good results—in other words, that the soft tube only influenced the superficial tissues.

Dr. N. J. Nunn of Savannah thought we should speak of the penetrating power of tubes and not of "hard" and "soft."

Dr. Albert C. Geyser of New York city thought accuracy regarding the penetrating power of the tube scarcely possible. He distinguished high and low particularly by the color of the light emitted; green for high and blue for low.

Dr. W. B. Snow determined the vacuum of the tube by the spark gap. If the largest spark gap possible is, say, one inch, the tube is low, while a spark of 4 or 5 inches indicates a high vacuum. In a tube having a large bulb the vacuum does not change so rapidly from the heating of the anode and kathode.

Dr. G. Betton Massey said that if more than he claimed for mercuric kataphoresis were true there would still be an immense field for the x-ray treatment of cancer. The x-ray was easier of application, and

would be found particularly useful in cases in which the area was too great for the successful application of a purely local treatment. In recurrent carcinomata of the breast the wide and deep penetration of the x-ray should prove especially valuable.

Dr. Robert Reyburn said that the reason the knife failed in the treatment of cancer was that the disease was always diffused beyond the part visible to the unaided eye and the knife laid open fresh channels of infection. The treatment of certain cases of cancer by caustic pastes was popular, because of its far-reaching action; and the x-ray acted in a similar manner, only with the important advantage that it yielded a much better cosmetic result.

Dr. Skinner, in closing, said that he was inclined to agree with Dr. Reyburn that the x-ray favorably influenced cases of cancer by exerting an influence on the surrounding cells, whereby the disease was walled off from the rest of the body. All of the cases reported in the paper had been treated with a Morton-Holtz-Wimshurst machine of twelve plates, and the effects had been such as to lead him to hope that still more might be accomplished by a sixteen-plate machine.

The X-Rays in the Treatment of Cancer.

Dr. J. D. Gibson of Birmingham, Ala., presented in this paper the clinical records of seven cases of epithelioma. He considered the x-ray, of proper penetrating power and when properly used, a specific for malignant growths.

Dr. Robinson of Lexington, Ky., believed the only way to conduct this treatment was by the use of a high vacuum tube, and he cautioned against too frequent treatments; twice a week was usually sufficient.

Dr. C. R. Dickson referred to the measurement of the penetrating power of the rays by thickness of tin foil.

Dr. H. Preston Pratt of Chicago said that thousands of lines of force were thrown off from the tube and the greater the concentration of these lines in a given area the greater the electro-chemical decomposition in that area, and hence the more rapid the changes in the tissues. After an experience of over six and a half years, and having given more than 30,000 treatments, he insists that a high tube must not be used; because the diminished number of the lines of force gives diminished action upon the cancerous growth. The healing of the surface which takes place when a high vacuum tube is used is due not to the x-rays alone, but to the static discharge from the terminals, which has also a tendency to spread the infection. A simple explanation of the action of the x-ray is found by supposing it to be similar to that of the ordinary electric current. On the side of the body exposed to the x-ray there is an acid reaction; on the opposite side an alkaline reaction. There is absolute proof that the action of the x-ray is due to changes produced in the ions by electrical force. Using a low tube on cancer, increasing the force of the machine increased the penetrating power of the rays. It was his experience that the static breeze in cancer cases is liable to cause muscular contraction and spread infection by pumping the germs thru the lymphatics.

Dr. Albert C. Geyser of New York city said that two years ago he had called attention to the advantage of using the static breeze on exposed surfaces.

Dr. Gibson, in closing, said that he had found the softest ray the most useful in skin cancers, but it required a ray of at least medium hardness to penetrate the body well. He was disposed to believe that the free use of the static breeze in the treatment was dangerous in that it favored the production of sepsis. While the breeze was an eliminator, it also served to in-

crease metabolism, and apparently favored the dissemination of sepsis.

SECOND DAY—WEDNESDAY, SEPT. 3.

Electrotherapy and the St. Louis Exposition.

At the suggestion of Mr. W. E. Goldsborough, an associate member of the association, the following resolution was unanimously adopted, and a special committee was appointed to cooperate with Mr. Goldsborough.

Whereas, There is to be held in the city of St. Louis in 1904 an exposition of the arts and sciences of the world as an expression of our advanced civilization; and

Whereas, We understand that the provisions to be made for the exhibit of the progress of electricity will be adequate, and feel that electro-therapeutics deserve special recognition;

Resolved, That the American Electro-Therapeutic Association heartily commends and supports the plans which have been inaugurated for containing an electro-therapeutic display commensurate with the dignity and importance of this branch of electricity.

Epithelioma of the Tongue.

Dr. C. R. Dickson of Toronto reported four cases; results of x-ray treatment not so good as in some other malignant cases.

Dr. H. P. Pratt had treated four cases of epithelioma of the tongue and cured two. He thought now that the other two died because the static breeze which was used to relieve pain had caused muscular contractions and forced the infection along the lymphatics.

Dr. W. B. Snow said that he had used the brush discharge a good deal for its tonic effect upon open surfaces, and had not met with infection—indeed, it was an excellent antiseptic application. The patient should always be inductively insulated, the discharging rods widely separated, and the

wooden electrode insulated by a tapering covering of glass.

Dr. Francis B. Bishop expressed the opinion that one reason for Dr. Dickson's not having obtained a better effect from the galvanic treatment was that his active pole had too much surface for the amperage employed.

Dr. Dickson replied that it had not been considered advisable to use general anes-

thesia. Dr. J. D. Gibson said he had cured lupus with the brush discharge alone, but preferred the x-ray. Cancers which have been surgically treated do not respond so readily to the x-ray.

Dr. A. D. Rockwell of New York city said the galvanic current and the x-ray relieved pain by causing a sort of circulatory drainage, diminishing pressure on the nerve endings. He preferred the so-called



FELLOWS OF THE ELECTRO-THERAPEUTIC ASSOCIATION.

Taken at Hotel Kaaterskill, Catskill Mts., N. Y., Sept. 4, 1902, by Dr. Marcus F. Wheatland.

thesia, and it was for this reason that this size had been used.

Some Therapeutic Notes on the X-Rays.

In this paper Dr. Dickson said he preferred the static machine and the high vacuum tube. During the first two weeks of treatment the tube should be one or two feet from the patient, the distance to be gradually reduced to six inches. Daily treatments are advisable only in critical cases. The average seance is ten minutes. He had used adrenalin solution and found that it intensified the reaction. A vascular nevus was slowly disappearing under the x-ray. Several cases were described.

hyper-static current to the brush discharge, and had seen excellent results from its use.

Dr. W. B. Snow used a glass shield in closed cavities, and also glass vacuum tubes, as kathodes with the static machine. He had found the brush discharge from the wooden electrode satisfactory.

Dr. Willis P. Spring of Minneapolis considered soft dental rubber to be opaque to x-rays, and valuable to prevent short circuiting of the tube.

Dr. W. W. Eaton of Massachusetts had found the hyper-static current valuable in chronic eczema and in severe facial neuralgias. In carcinoma and sarcoma he ad-

vised the galvanic current with the x-ray.

Dr. H. P. Pratt declared that one cause of x-ray burns is that microbes from the atmosphere are driven from the surface of the tube into the body. This can be avoided by interposing a thin celluloid shield between the tube and the body.

Dr. C. E. Skinner did not favor this explanation, stating that one of his patients had been badly burned by the x-ray thru a surgical dressing.

Dr. R. J. Nunn said that if microbes

A New System for Producing a Slow Alternating Current of Large Amperage for Therapeutic Use.

Dr. Lucy Hall-Brown of Brooklyn, N. Y., described and exhibited some apparatus, the invention of Mr. Patten, modified and manufactured by E. A. Callahan of Brooklyn. A continuous current, such as the Edison current, is transformed into a slow alternating current of a sinusoidal character. The current strength may be varied from zero to 300 or more milliam-



FELLOWS OF THE ELECTRO-THERAPEUTIC ASSOCIATION.

Taken Sept. 4, 1902, by Dr. Willis P. Spring.

could be driven in by the x-ray, so could other things.

Dr. Pratt replied that Dr. Alexander Wiener, a surgeon of Chicago, had invented a "celluloid cream" as a base, and with it he mixed 10 per cent of creosote. It was found that when this was applied over a tuberculous gland the creosote was driven in by the x-ray and the gland was reduced in two or three weeks. Experiments showed that the medicament was actually driven into the body.

peres. The apparatus consists of a tub filled with distilled water, and having carbon plates on opposite sides. At the center of the tub is an insulated spindle, which is revolved by clockwork or by an electro-motor. At either side of this spindle is a plate of carbon or metal, the spindle and plates forming an armature. As the revolving plates approach the fixed plates a current is set up in the patient's circuit, and this gradually increases until the nearest point is reached. After pass-

ing the terminal plates the current diminishes to zero again, the direction of the current changing.

Dr. A. D. Rockwell agreed with the reader of the paper that this current would not relieve pain when it was due to a neuritis or any acute or subacute inflammatory condition.

Dr. G. B. Massey and Dr. H. P. Pratt commended the apparatus and said they would expect very good results from it.

use by others of static electricity. The case was evidently of toxic and central origin and deeply seated. The treatment which he had adopted with complete success was as follows: A kathode of clay, three by four inches, was applied to the solar plexus, while the anode was applied by the labile method to the cervical and upper dorsal regions, and occasionally to the left arm. The strength of the current was from 20 to 60 ma., and the seances



FELLOWS OF THE ELECTROTHERAPEUTIC ASSOCIATION.
Taken Sept. 4, 1902, by Dr. Willis P. Spring.

Current Differentiation Illustrated by a Case of Peripheral Neuritis Due to Parenchymatous Degeneration of the Cord.

Dr. A. D. Rockwell of New York city was the author of this paper. The case was presented: (1) because it illustrated a somewhat unusual form of neuritis; (2) as an excellent example of the necessity for careful differentiation, and (3) because of the prompt relief afforded after the failure of all other methods, including the

were of ten minutes' duration and were repeated daily.

Dr. Brower, Dr. Eaton and Dr. Massey referred to the tendency to neglect galvanic treatment on account of the greater convenience of static electricity.

Dr. F. B. Bishop placed the galvanic battery at the head of electro-therapeutical apparatus. Localized pain was often relieved by galvanism.

Dr. J. D. Gibson said it was exceedingly difficult to reach deep pains in the dorsal regions by the static current.

Some Therapeutic Indications from the Use of the Electric-Light Bath.

Dr. T. D. Crothers of Hartford, who read this paper, said that the sudorific action of the electric-light bath was superior to that of the ordinary hot-air bath. The bath that he had employed consisted of a room, five feet square and six feet high, lined with tin and lighted by one hundred incandescent electric lamps of sixteen candle power each. The entire body of the patient was exposed to the light in this room, the head being covered with a napkin, because experience showed that the treatment caused a marked drying of the hair. Sweating usually began in from two to seven minutes, and became profuse in from ten to fifteen minutes. The average duration of the treatment was twelve minutes. The regularity and force of the heart's action were increased by the treatment, and this improvement lasted for some time afterward. The patient was allowed to drink water very freely. After the bath, massage was given with hot or cold showers, and the patient then went to bed, the baths being usually given in the evening. The bath was found to promote sleep and diminish the cravings of drug-takers. The particular disorders which seemed to be influenced by the bath were neuritis, myalgia, and extreme nervous irritation. Arteriosclerosis appeared to be materially benefited by the electric-light bath.

Dr. W. B. Snow said that the therapeutic effects obtained by Dr. Crothers were due to heat and not to light; but higher temperature should be used.

Dr. Robt. Newman said that the light treatment is simply an imitation of sunlight, which is necessary to our existence.

Dr. M. M. Johnson of Hartford was convinced that part of the effects obtained by Dr. Crothers were due to light.

Dr. Chas. O. Files of Portland, Me., advised the exposure of the whole person,

including the head, to the electric light in the treatment of tuberculosis. He used two arc lights and 35 incandescent lamps, either collectively or separately. The light bath promoted sleep and caused increased secretion.

Dr. J. D. Gibson had used lights of 8,000 candle power for tuberculosis, in a medium sized room, protecting the eyes.

Dr. Robt. Reyburn said that the transparency of the human body to sunlight is underestimated by most physicians.

Dr. Crothers said that any hyperesthetic part of the body became intensely red in the light bath. During the following day there was a feeling of contentment and exhilaration.

Some Obstacles to the Progress of Electro-Therapeutics.

Dr. Chas. O. Files of Portland, Me., said that one of the first obstacles encountered was the dense ignorance prevailing even among physicians concerning medical electricity. The remedy was to be found in the general diffusion of knowledge among physicians and laymen relative to the curative properties of the electric current.

A Portable Electric Apparatus for Medical Use.

Dr. Robert Reyburn of Washington, D. C., exhibited an apparatus, consisting of a wooden box, about six inches square, containing five dry compound cells, each made up of three cells, making the total voltage 22.5. The batteries, which cost forty cents each, are made for small electric-light outfits. The apparatus would yield a current of thirty or more milliamperes. Instead of the expensive and delicate milliamperemeter, he used Queen's galvanoscope. This can be calibrated experimentally with sufficient accuracy. One milliamperere deflects the needle 10°. In place of the water rheostat he makes use of a rod of carbon, having a resistance of about four thousand ohms.

Newman's Portable Galvanic Battery.

Dr. Robert Newman of New York city designed this battery years ago, but had more recently modified and improved it. All parts of the battery are visible, and the apparatus is portable. The cells are empty in transit, and are only filled at the place where the battery is to be used. The ordinary acid bichromate fluid is carried in a concentrated form, and is thrown away after the battery has been used. A dilution of acid of one in ten or one in twenty is sufficiently strong, and two and a half ounces of bichromate of potassium are added for each ounce of the battery fluid. The battery consists of twenty hard rubber cells, with zinc and carbon rods for the elements. If desired, the battery can be used with only ten of the cells filled. The apparatus is provided with a simple and convenient current selector.

The Diffusion of Iodine by the Electric Current.

Dr. M. F. Wheatland of Newport presented this paper. His experiments showed that iodide of potassium followed the well-known physical laws governing electrical decomposition, and that there was no reason for believing that iodine is projected into the tissues by the positive pole, as asserted by some writers.

Dr. Robert Newman insisted that cataphoresis was only one part of electrolysis. He said that in the electrolysis of iodide of potassium the positive pole would attract the iodine and the oxygen of the acids, while the negative pole would attract the base, the alkalis, and the hydrogen.

Dr. H. P. Pratt said that he had succeeded in driving in iodine with the positive pole, but it had returned immediately. This was due to the fact that iodine is electro-negative.

Arthritis Deformans.

Dr. Francis B. Bishop of Washington, D. C., in this paper said that in addition to a diet of proteids with an abundance

of water, electric sparks to the joints or the wave current should be used. For an effusion into the joint he used a strong galvanic current. Electricity alone will not do; but in conjunction with proper diet a cure is possible.

Dr. Snow had treated 30 or more cases of rheumatoid arthritis with good success by using electricity to improve the general nutrition. Hot air treatment is valuable. Pain is relieved by the brush discharge.

Dr. D. R. Brower of Chicago advised an abundance of red meat and little or no sugar or sugar producing substances.

Dr. C. E. Skinner considered this disease to be of central nervous origin. He approved of a nitrogenous diet, electricity and hot air treatment.

Dr. N. C. Nutting of New Hampshire had found starch and sugar very injurious to rheumatic subjects. He advised plenty of meat and water.

THIRD DAY—THURSDAY, SEPT. 4.

The Relation of Psychic Suggestion to Electrotherapeutics.

Dr. Maurice F. Pilgrim of Boston discussed in this paper the philosophy of the healing of disease and the relation to true medical treatment of such fads as Christian Science. Great stress was laid upon the important part played by the *vis medicatrix naturae*, and a word of caution was uttered against hasty and enthusiastic generalizations and deductions from observations of the supposed effects of medicine and other means of treating disease. Emphasis was laid upon psychic suggestion as an important adjuvant to electrotherapy. By using psychic force in connection with electrical treatment without saying a word to his patient, he had been able to get better results than from electrotherapy alone.

Illustrative Cases in the Cataphoric Treatment of Cancer.

Dr. G. Betton Massey of Philadelphia reported a number of cases to illustrate the

efficacy of this method of treatment. Some of the clinical records were accompanied by photographs showing clearly what had been accomplished.

Officers Elected and Place of Meeting.

President, Dr. D. R. Brower of Chicago; first vice president, Dr. Maurice F. Pilgrim of Boston; second vice president, Dr. C. Frank Osman of Boston; treasurer, Dr. R. J. Nunn of Savannah; secretary, Dr. Clarence E. Skinner of New Haven; executive council, Drs. F. H. Morse and Charles O. Files. The next annual meeting will be held at Atlantic City in September, 1903.

CHICAGO ELECTRO-MEDICAL SOCIETY.

The fourteenth regular meeting of the Chicago Electro-Medical Society was held in room 912, Masonic Temple, Sept. 30, 1902, at 8:30 p. m., President Burdick in the chair. The minutes of the previous meeting were read and approved.

The resignation of Dr. A. W. Baer as an officer and member of the society was received and read, and on motion of Prof. Treadwell, was laid on the table until the next meeting. At the adjourned meeting this motion was reconsidered and the resignation accepted.

Professor C. H. Treadwell read a paper on "The Use of the X-ray in the Treatment of Cancer." The paper was discussed by Drs. Grubbe, Fitch, Burdick and H. P. Pratt.

Prof. C. H. Treadwell then moved that, in view of the fact that there are two factions in the society, and that the society's usefulness has come to an end in consequence, the Chicago Electro-Medical Society do now disband. The motion was seconded. Several members rose to discuss the question, but President Burdick refused to allow discussion. Appeal was made to Roberts' Rules of Order, but the president called for a standing vote. The motion was lost.

President Burdick declared the motion carried, and withdrew from the room, along with all who supported the motion. Dr. W. A. Pratt was then elected chairman.

Applications for membership were taken up for consideration, and the following were elected to membership: Dr. William E. Holland, Dr. Vine L. Smith, Dr. A. W. Smith, Dr. Fidelio F. Brown, Dr. R. L. Snow, Dr. J. Lloyd Hammond, Dr. J. E. Harper, Dr. John C. Delprat, Dr. Frank Doud, Dr. W. D. H. Brown, Dr. Ernest L. Hayford, Dr. P. C. Ridpath. Pursuant to notice given at the last regular meeting by Dr. H. P. Pratt, the revised constitution was read, and after being considered clause by clause, was adopted.

Notice was given of amendments to the by-laws to be proposed at the next regular meeting.

Dr. W. A. Pratt was elected third vice-president. The secretary, the third vice-president and Dr. H. P. Pratt were appointed a committee, with instruction to secure a charter from the State for the Chicago Electro-Medical Society. Dr. H. P. Pratt was appointed a committee of one to negotiate regarding affiliation with the Chicago Medical Society or the State Medical Society.

It was moved, seconded and carried that THE AMERICAN X-RAY JOURNAL be made the official organ for a period of five years from this date, and a committee consisting of Drs. Smith, Bartlett, and Replogle were appointed with power to conclude financial terms with the publishers. The society then adjourned the session for one week, instructing the secretary to arrange for a place of meeting and notify the members then present.

At the adjourned meeting a paper by Dr. J. E. Harper, on a Case of Melano Sarcoma of the Eye, was read by the secretary and discussed by Drs. W. A. Pratt, L. D. Rogers and C. H. Upton. On mo-

tion it was resolved that the publication committee be directed not to publish Prof. Treadwell's paper, as it was not considered of sufficient interest to members of the medical profession.

The following new members were elected by unanimous vote: Dr. Geo. F. Hawley, Dr. W. K. Harrison, Dr. L. W. Rowell, and Dr. Byron Robinson.

Dr. E. S. Pettyjohn was elected first vice-president.

The following additions and changes were made in standing committees. The membership committee to consist of Drs. Bartlett, F. H. Blackmarr and Wm. E. Holland.

Publication Committee, Dr. H. P. Pratt, chairman.

Scientific Research, Dr. Byron Robinson added.

Executive Committee to consist of Dr. H. P. Pratt, chairman; Dr. J. E. Gilman and Dr. L. D. Rogers.

Judiciary Committee, Dr. L. D. Rogers, chairman; Dr. W. A. Pratt and Dr. A. W. Smith.

Charges were preferred against the president, Dr. G. G. Burdick, for conduct unbecoming an officer of the society, and against Drs. Burdick, Grubbe, and Street, and Messrs. Treadwell, Friedlander, Slater, and Scheidel for conspiracy to defeat the objects of the society. The charges were received and referred to the judiciary committee, which was given power to cite the said members before them or before the society.

It was resolved that the meetings should be held on the fourth Wednesday of each month, unless otherwise ordered by the executive committee.

The executive committee was also empowered to take such steps as it may deem necessary in order to protect the legal rights of this society. The meeting then adjourned.

T. PROCTOR HALL, Sec'y.

EDITOR AMERICAN X-RAY JOURNAL:

There is a good field here for the x-ray work and no practitioner that is competent. I wish a thoroly competent, magnetic, high-toned partner, with plenty of good common sense and experience (not bluff but sense and experience). Can you put me in communication with such a person? One you can recommend, a good financier. The opening is here, but I do not feel myself competent to undertake it alone, the responsibility is too great. I am equipped with the Betz static machine and appliances, with the exception of the screens. Among your many pupils you may find some one who will wish to come to this delightful spot. Some capital is required.

Respectfully,

H.

Some of the Therapeutic Uses of the X-Ray.—E. D. Bondurant reports a case in which the use of the x-ray completely relieved the pain of a carcinoma of the face, caused a cessation of discharge and the formation of healthy granulations, the present condition being that of a fairly healthy ulcer, which is steadily healing. In a second case there is apparent cure of an epithelioma of the face; in a third the progress is extremely satisfactory after only eleven treatments; and in a case of lupus, the nodules are shrinking and the ulcerated surface is healing after ten sittings. A specific effect in relieving pain has been attributed to the x-ray, with ample confirmatory evidence. It has a remarkable influence in stopping the pain of carcinomatous growths, and the author has known it to cure facial and intercostal neuralgia, headache, and functional nerve pains. The permanence of the cures of epithelioma, lupus, etc., can be demonstrated only by time. Recurrences have thus far been infrequent, but not unknown.

EDITORIAL.

In the treatment of urethral strictures by electrolysis, the venerable Dr. Robert Newman is both pioneer and acknowledged master. His results are unquestioned and marvellous. His method has borne the test of time and is now widely used in different parts of the world. The essence of his method is the solution of the stricture by the chemical action of the negative electrode, using no force, and with such a small current that the slight inflammation induced by the operation soon subsides. We commend Dr. Newman's clear and concise paper to the attention of every surgeon. When such painless, safe and perfect results are attainable by electrolysis the use of the cautery or knife is hardly justifiable.

ROENTGEN RAY SOCIETY.

The next meeting, which will be held December 10 and 11, at the Sherman House, Chicago, will undoubtedly be the largest and best meeting in the history of the Society. Under the able direction of the executive committee, of which Dr. Weston A. Price is chairman, a superior program has been arranged; and many features of unusual interest are being prepared.

No one who wishes to keep himself abreast of the times in x-ray work can afford to miss this meeting. Physicians especially should make it a point to be present and join the Society. The JOURNAL will be glad to receive and forward applications for membership, and give any information that we are able to in reference to the meeting. Physicians and others are invited to make our office their headquarters during their stay in the city, and have their mail addressed to our care, 1207 Masonic Temple. Dr. Price reports that arrangements are well under way for reduced rates by rail from all parts of the country.

Exhibitors of apparatus connected in any way with x-ray work can arrange for floor space with the chairman of the local committee, Dr. Ralph R. Campbell, 414 Marquette building, Chicago.

COMMERCIALISM IN MEDICAL SOCIETIES.

The commercial spirit finds its way into even the healing art. For some time this had been felt by the members of the Chicago Electro-Medical Society, and notice had been given of changes in the constitution which would decrease the power of non-medical or associate members of the society, from whom chiefly the commercial impulses seemed to be derived. In order to forestall this action a puerile attempt was made by these associates, supported by the president and two or three members of the society, to disband the organization. The conspirators had previously secured from the State a charter for a "Chicago Electro-Medical Society," the existing organization not having had a state charter. The charter of the conspirators is perfectly useless to them, since they can be easily enjoined from using it; but the fact that such an attempt was made to capture the organization is a warning to all to draw the lines strictly according to medical ethics. Charges have been preferred against the conspirators by the society. Since the revision of the constitution and the practical withdrawal of the disturbing element, a large number of new members has been received into the society, and many more applications are on hand.

At the next regular meeting, which will be held at room 912, Masonic Temple, Wednesday, Oct. 29, at 8 p. m., papers will be presented by Dr. Pettyjohn, Dr. Blackmar and Dr. Hall. All physicians and others interested in the medical applications of electricity and the x-rays are invited to visit the society.

Charles Warren Allen, M. D., in the Medical Record for January 25, 1901, reported the x-ray treatment of "Six cases of epithelioma—one upon the chin, two upon the nose, one upon the finger, one upon the forehead, and one upon the cheek. Four were recurrent cases, and one primary. One disappeared from observation; the others have done well, and might be considered cured, but all are still taking ray treatment, and I trust will continue to do so for some months. Besides these cases, I have observed a number of others, and have seen a number of times in consultation a gentleman with an extensive recurrence, in whose case the x-ray has been practically the only form of treatment applied. This extensive growth has decreased nearly one-half in size, and the general condition has improved, encouraging us to persevere in it.

"Most of my work has been done at rather close range—three to five inches. With the glass at an inch or less from the skin, as I have at times used it, the anode is still several inches away, when a large tube is employed. The nearer the tube and the longer the exposure, the greater is supposed to be the danger of 'burn.' Still, in such a severe affection one might be justified in taking a certain chance, and if the 'burn' affects the diseased area alone, I am not sure that the cure would be delayed in consequence. At times there seems to be a marked lessening of pain in the part after the ray treatment, and this effect has been noted in other conditions, such as articular rheumatism, gall stones, etc.

"Effects noted upon an open ulcer are usually a lessening of exudation, if it has existed; a drying up and glazing over the parts, and desquamation about the margins, from which cicatrization takes place. Sometimes there is a suppurative breaking down of neoplastic tissue.

"The prevailing opinion seems to be that a tube, to do the best work in skin

diseases and cancer, should run low, *i. e.* that the vacuum should not be too attenuated, the tube thus running on about two or three inches of spark on the outside and giving poor penetration, *i. e.* if the hand is held before the fluoroscope, you should get a dense, black shadow of the hand without differentiation of tissue and bone." (That depends upon the depth and density of tissue to be treated. The tube should produce rays that penetrate every part of the cancer.—Ed.)

"Williams has employed 220 volts with two amperes and 35 cm. spark-gap, without causing dermatitis.

"Williams states his preference for the static machine for therapeutic uses of the rays. Others prefer the coil. As to strength of current, Freund advises an electro-motive force of 12 volts, with 1.5 amperes resistance, and a spark-length of 30 cm., or about 12 inches.

"The ray is always the same no matter how produced, and this is a point which is not always appreciated. Whether our electrical apparatus is static, high frequency, or induction coil; whether large or small, powerful or weak, if it produces an x-ray that will do the work, *i. e.*, if there be sufficient current and sufficient spark-gap, this ray is as good as any other ray produced in any other manner."

Statements about the number of volts and amperes of the primary current give as much information about the x-rays as we would get by knowing the length of hair and color of eyes of the man who watched it, and no more. The phrase "1.5 amperes resistance," while presumably a misprint, is in keeping with the deplorable ignorance shown by the whole paragraph. The criticism, implied rather than expressed, in the second paragraph above is entirely too mild for the occasion. A similar statement made by Dr. Pusey was criticised by Dr. H. P. Pratt in the Chicago Electro-Medical society as follows:

VARIABLE FACTORS IN X-RAY PRODUCTION.

I notice in the December number of the *AMERICAN X-RAY JOURNAL* a letter from Dr. W. A. Pusey of Chicago, in answer to a letter of inquiry in relation to a reprint of his on the x-ray in the treatment of skin diseases, in which he discourages the use of the static machine for x-ray work in treating acne, hypertrichosis, sycosis, etc., and gives reasons for the same. The following is a quotation from his letter in the *Journal*: "It is necessary that all the factors involved in producing the light (x-rays) be definite, and that there be repeated exposures to a weak light, the effect of which may be controlled, rather than the use of a strong light for a few exposures. As I said in that paragraph, I used the technique suggested by Schiff and Freund, described in my previous article, in which the light is produced by standard current of twelve volts and one and one-half amperes and a coil of 30 cm. spark length. I believe it is only by maintaining your factors definite and using a weak light that you can pursue the method with safety in all cases. The light produced with the static machine is in quantities which are greater than is safe to use repeatedly for long exposures and there is no way of accurately determining the factors in the production of light."

Such statements as these are misleading and misrepresent the facts, and physicians having a thoro knowledge of x-ray physics will bear me out in this statement. It is true that there is yet a good deal to be learned about the physics of x-rays, but if there is one thing that all experienced operators have demonstrated to a certainty, it is that it is impossible to maintain definite factors.

The force projected from the vacuum tube is electric in character and of very high potential, it acts on matter in the same manner as any electro-motive force; that is to say, it produces a dissociation of molecules along its lines of force,

which is electrolysis. The light which is emitted from the vacuum tube is the result of the decomposition of the molecules in the atmosphere around and inside the tube. This light is not the x-ray current; the x-ray force is purely electrical and is invisible. It appears to me that if we consider the x-ray as an electric current of very high potential which makes its circuit from the inner surface of the tube outward, perpendicularly to the surface, then radiates in straight lines until the potential falls, when the rays return to complete their circuit by the terminals, we have a simple and practically useful explanation of all the phenomena.

The x-rays are produced by the bombardment of the molecules of residual gas against the inner surface of the tube. The number of molecules of gas in the tube determines the degree of vacuum. When the tube is excited, some of the molecules of gas are thrown from the cathode against the antikathode which serves as a target, causing the molecules to rebound and strike the inner surface of the tube. This point of impact on the inner surface of the tube is the source of the x-rays. Every molecule of gas striking the inner surface of the tube causes one or more lines of force to be thrown out at right angles to the surface of the tube. The distance to which the lines of force are projected, or, in other words, the limit of the penetrating power of the ray, depends entirely upon the potential of the tube, and this, in turn, depends upon the force of impact of the individual molecules of gas. The higher the vacuum the less the number of molecules of residual gas in the tube; the greater the free path, the lower the potential and the less the penetrating power. The lower the vacuum, the greater the number of molecules; the less the free path, the lower the potential and the less the penetrating power. The force projected from the x-ray tube, being electrical, must follow Ohm's law. The cur-

rent is equal to the electro-motive force divided by the resistance; that is to say, the potential of the tube may conceivably be measured in volts, the resistance to the x-ray current measured in ohms, the amount of current measured in fractions of an ampere, and the amount of work done measured in a fraction of a watt. To obtain the measurement it requires an expert physicist; the poor doctor is not in it.

So you will see there are three factors that enter into the problem of the x-ray current—the potential, the resistance, the current—with no one constant factor. They vary with each excitation of the tube; this variance is due to the degree of vacuum and the force of impact of the molecules of residual gas on the inner surface of the tube. With each excitation of the tube the vacuum increases, thereby changing the other factors, so that the main and almost the only factor is the degree of vacuum in the tube, and not the form of apparatus used in exciting the tube. The degree of vacuum required varies according to the part being treated, and can only be determined by close observation of the working of the tube and the susceptibility of the patient to electrical influence. This is the whole thing in a nut-shell. There is no one method that can be followed; you must vary the factors to suit the case. If Dr. Pusey is of the opinion that with a coil of 30 cm. spark length, voltage of 12, and an amperage of one and one-half, he can maintain a definite amount of energy in the tube, he is laboring under a misapprehension. He must study the tube factors first and vary the other factors to suit. While the amperage and voltage is for all practical purposes constant, the work that is being done is almost entirely confined to the tube, which is constantly changing the degree of radiation. The doctor has the cart before the horse.

The tube's radiation should be kept

constant, as far as possible, by varying the force in the apparatus which energizes the tube. It must be remembered that the tube varies with each excitation, and consequently it requires an increase or decrease of the amperage on the primary circuit to keep the tube at a comparatively constant radiation. But complete constancy is absolutely impossible, as the vacuum increases every time the tube is excited, consequently changing the degree of the radiating energy. It must not be forgotten that the x-ray current produces an electrolytic effect on the tissues of the body; this electrolytic effect is increased or decreased according to the number of lines emanating from the tube.

All substances thru which the x-ray passes form part of the x-ray circuit. When this radiating energy comes in contact with the tissues, it changes the relationship of the ions composing the same, producing an increased metabolism. The static machine can be harnessed up by an expert to produce the same results as the doctor obtains from his coil.

Our Offer.

Chicago physicians who will send us \$3.00 subscription for the AMERICAN X-RAY JOURNAL for one year, and who so request, will be proposed for membership in the Chicago Electro-Medical Society, and we will pay their membership fee of \$3.00 for one year. We make this liberal offer solely in the interest of the physicians of Chicago.

In the Medical Record Mr. Chisholm Williams of London described his results in the treatment of pulmonary tuberculosis by means of electrical currents of high frequency and high potential. He referred to forty-three cases so treated, all being of a severe type. At first, after each application, the temperature rose, but each successive rise was less, and when no rise followed, arrest of the disease had occurred.

CORRESPONDENCE.

Chicago, Oct. 3, 1902.

The Editor of American X-Ray Journal:

In your August issue, under the heading, "Glass vs. Mica Plates," we note, in commenting upon our acceptance of the challenge made against our statement that "*2 Mica Plates equal 10 Glass Ones*," you suggest that in addition to the machines selected for trial, viz., the worst that can be found by the opponent in each case under R. V. Wagner & Co.'s conditions, each contestant be asked to furnish the best machine he is able to produce. If you will refer to our acceptance of this challenge you will note that we specifically state as one of the conditions that "the machine selected for the test shall have been sold in the open market, by the respective contestants, *within two years*, and shall be selected from the offices of parties now using the same, or trying to do so; we to furnish the machine manufactured and sold by our opponent, he to furnish any 4-plate Mica Static machine which has been sold by us. It is understood that these machines shall not be broken, or otherwise injured, and that each party shall have six hours prior to the test to produce the necessary adjustments for making the machine work at its best, but not to replace or add parts."

A machine sold within two years should not be the worst that can be found, and a machine that has been sold within two years that cannot be put into first class condition in six hours, even with the worst kind of usage, would show very bad construction on the part of the maker.

Our reasons for making this condition, which we consider absolutely fair, are that those interested in static machines, or contemplating the purchase of a machine, are not concerned about the best machine that can be made by each manufacturer, as suggested by you, but they are, or should be, greatly concerned in the kind of machine that they are expected to pay their hard-earned dollars for, to-wit, the ma-

chine which is being offered by the manufacturer in the open market. Any machine which we have sold in the last two years is just as good as we know how to make, and our competitors, after having made so many unfair statements, without any foundation of truth whatever, that Mica Plates scale, crack or otherwise deteriorate with age, ought to be glad to have an opportunity of selecting one of our machines which has been in use for a couple of years. If our competitors' machines have such superior lasting qualities, why do they object to the use of a machine for the competitive test which has been out for a period of two years only, or less? The only reason is that unless the glass-plate machine was especially constructed it can not safely be run at a very high speed, and it is a well known fact that the faster a static machine is run the more current it will generate.

The advantage which we derive from the use of Mica Plates is principally due to the high speed at which they may be run. If two glass plates could be run at as high a speed as two mica plates, the volume of current would be nearly the same, other things being equal. Any manufacturer of glass-plate machines could, by a very careful selection from a large number of plates, procure enough for a test machine practically true, which would permit of higher speed. For a test machine the plates could be heavily bushed with soft rubber, so as to greatly decrease the amount of vibration, which is what breaks glass plates when revolved at high speed. Glass plates could also, for a test machine, be ground off on the heavy side and perfectly balanced, which would greatly reduce their liability of breakage at high speed; but none of these conditions are complied with by makers of glass-plate machines in their commercial article; the expense of obtaining perfectly true plates would be too great. Soft rubber bushings could not be used because they would very quickly rot from

the action of ozone, and we know of no one that is grinding revolving glass plates so as to perfectly balance them.

The only possible way any static machine can compete with the Mica Plate, in any way, will be that it is so constructed as to permit of a high speed, as the high speed not only greatly increases the volume of current, but develops a very high tension current, which is superior for X-Ray and most therapeutical purposes.

Glass Plate machines with plates as large as 28 inches in diameter, as found in the open market, will not safely permit of being run at a speed of over 500 revolutions per minute; disastrous results have often been obtained at a much lower speed than this, and in any competitive test of glass plates, as compared with Mica ones, the great difference in speed at which they can be run will substantiate our claims for Mica Plates.

It is easy enough to make a challenge, but it is also very easy to do nothing after the challenge is accepted. We are surely ready to make any reasonable concession on our part in order to procure a competitive test.

Yours very truly,

R. V. WAGNER & COMPANY.

R. V. Wagner, President.

EDITOR AMERICAN X-RAY JOURNAL:

I have a static machine with seven 28-inch revolving plates and wish to increase the output by adding another machine. Do the two machines have to be exactly alike? [No.] Or will any two machines work together? [Yes.] Does the speed of the machines have to be exactly the same, and do the plates have to be the same size in both? [No.] Is it customary for manufacturers to supply machines with 28-inch revolving plates when 30-inch are promised, and so specified in order? [No.]

W. C.

Editor American X-Ray Journal:

Permit me kindly to differ from the following under editorial notes, "Electricity is not a cure-all. It is a form of energy which can be advantageously used

to cure disease, differing not at all in this respect from heat, light and other physical agents."

Now this explanation was satisfactory enough a few years ago when Webster, Worcester and Gould inserted a lot of nonsense to cover up ignorance, in place of a definition.

Even Kulle, the author of "The X-Rays," declares that electricity is a force, not a substance, and is constantly trying to reach an equilibrium, etc. Prof. A. E. Dolbear, the eminent physicist of Tuft's College, Mass., deprecated all allusions to electricity as a force external to matter and independent of it. Electricity, light, heat and chemic action are inherent properties of matter, electricity being the rotatory property of atoms, light the vibratory property, etc.

Without oxygen, I defy you to generate or produce any kind of an electrical current, whether galvanic, faradic, static, x-ray, or any form whatever. It is an utter impossibility to do so. Quibble over this assertion as much as you choose, I request a demonstration to disprove it.

Then this thing with a misnomer, so-called electricity, is of humble origin, is of the Gas family, none the less respectable, equally useful as a curative, as if under the miraculous, misconceived name of energy, force, agent, etc.

Aid me in promulgating this discovery to the profession; it is not protected by copyright. Neither will there be any demand to fight over priority. It is for the enlightenment of all humanity. Electricity is a misnomer. Ozone is the title; it is a substance. With high esteem, I subscribe myself,

Ozonely Thyne,

THEO. F. JOHNSON, M. D.

[Professor Dolbear's view is correct. Neither electricity nor any other form of energy appears "external to matter and independent of it." But to argue from this that electricity is a form of matter,

is to confuse things that are entirely different. Matter has weight, and is composed of atoms. Ozone is one kind of matter. Energy is the capacity for doing work. It is measured by the amount of work it can do, in any given case. For instance, the difference between a coiled watch-spring and a loose spring of the same kind is that the coiled spring has energy (can do work) that the loose spring does not have. Heat is a form of energy, that is to say, a hot body can do work which the same body when cold can not do. Electricity is a form of energy, that is to say, an electrified body can do work which the same body unelectrified can not do. No man who has even a faint idea of the meanings of the words electricity and energy can deny that electricity is one form of energy, or can assert that electricity is ozone. These two, electricity and ozone, are often associated; but association is not identity. For an example of electricity without oxygen our correspondent is referred to the common Le Clanche (Zn, NH_4Cl) cell, in which the water acts only as a vehicle for the salts. If this is not satisfactory on account of the presence of the water, we refer him to a dynamo, for whose working neither oxygen nor any of its compounds are essential.—Editor.]

H. P. PRATT, M. D.:

Dear Doctor—I have not been able to find much on x-ray treatment except what is in your journal.

I have plenty of patients to use the x-ray on when I get my outfit, but feel shaky about starting, and would like your advice. Man, 45 years old; cancer three inches up in rectum, large as a goose egg. Must I expose up rectum, or can I treat through abdomen? How often and how long exposure? Is there more danger of a burn through the rectum? Will covering with vaseline help to prevent a burn? What would be the prognosis, and shall I try it? In treating tuberculosis, how near should the parts be to the tube, and how often should I expose? How long after exposure before a burn shows up? How shall I know when to stop exposure on account of liability to burn?

Do you advise getting a Finsen Ray that Betz is going to have soon, and is there as much danger of burn from that?

I thank you for your courtesy while I was in Chicago, also for answering my questions.

Respectfully yours, E. A. L.

[Expose thru a rectal speculum with a low tube, and also thru the abdominal wall with a higher tube, alternating daily. Begin with 5-minute exposures per rectum, 7 or 8 minutes externally, and gradually extend to 10 and 15 minutes. When the mucous membrane or the skin becomes red and very tender, stop treatment a few days, and use mild antiseptic dressing to prevent infection.—Editor.]

EDITOR AMERICAN X-RAY JOURNAL:

Dear Sir—As to the therapeutic quality of treating "birth mark" with the x-rays, I can find no reference. I have commenced to treat such a condition and am exposing a small portion of the discoloration, intending to produce quite a burn and see what results are possible.

If you have any suggestions, would be pleased to have them, and will give you an explicit report of the outcome.

Very Respectfully, H. W. W.

[Birth marks have been treated successfully by the x-ray by a good many operators. A low tube is best. It is not necessary to cause a severe dermatitis.—Editor.]

EDITOR AMERICAN X-RAY JOURNAL:

Dear Doctor—I want your AMERICAN X-RAY JOURNAL, and in the scramble I have lost my sample copy. Please have me the September number sent with a subscription blank. I have a case of tubercular cystitis, which is very interesting. She has a spinal lesion, showing self-limiting and self-recovering Pott's disease. I evacuated the abscess and removed half the right mammary, for tubercular abscess, a year ago. The bladder and bowels caught up the infection. I have given her 15 x-ray treatments, 10 to 12 minutes each, until the abdomen showed slight erythema. The lymph nodules in the groin seem to be clearing up, and her general condition seems to improve, appetite, etc. The neck of the bladder at the urethral orifice is the seat of ulceration—how extensive I cannot tell. She has had no hemorrhage. This ulceration is very painful sometimes, during micturition and when the bladder becomes distended with urine. I have used the Crookes tube above the pubes, and don't know how to reach the ulcer for

exposure, the pubic bone being in the way of the urethra. The treatment has not relieved her pain; if anything, she seems to suffer worse. I also inject daily a 5 per cent iodoform emulsion. I have fought this case desperately with tonics, nuclein, etc. I now have her on pepto-mangan (Gude). Have been giving her formamin for six months, 20 grains daily. She has held her own comparatively well, only having lost 10 pounds in a year. Tubercular bacilli are still found in the urine. Can you suggest anything that would be of benefit, or do you know of any cases treated, together with prognosis? This is a dreadful thing to happen anybody. It takes $\frac{1}{2}$ grain morphia to relieve the excruciating spasmodic attack which comes on after using the urethral dilator, or every day or so if no treatment at all is instigated. Excuse the length of this. Anything you suggest will be appreciated. Sincerely yours,

C. L. H.

[Use a thin celluloid speculum, and treat through the vagina. Protect the external parts by lead-foil.—EDITOR.]

Meeting of the Roentgen Ray Society.

The next meeting of the Roentgen Ray Society will be held in Chicago, December 10 and 11, and promises to be the best meeting in the history of the Society. A very fine program, which will be announced later, has been secured, and on it are several of the leading men of Medicine and Science. We will have a manufacturers' exhibit, showing the latest improvements and most approved forms of apparatus. The local preparations are in the hands of a most excellent Committee, as follows:

DR. RALPH R. CAMPBELL, *Chairman*,
414 Marquette Bldg., Chicago.

DR. JOHN B. MURPHY,
Reliance Bldg., Chicago.

DR. LOUIS E. SCHMIDT,
424 North State Street, Chicago.

DR. M. L. HARRIS,
100 State Street, Chicago.

DR. W. L. BAUM,
103 State Street, Chicago.

DR. H. G. ANTHONY,
465 Dearborn Ave., Chicago.

DR. W. A. PUSEY,
Columbus Memorial Bldg., Chicago.

For any particulars or information, write to either the Executive Committee or the Committee on Arrangements.

WESTON A. PRICE, D. D. S.,
Chr. Ex. Com.

X-Light in the Treatment of Cancer.*

BY PROF. CLARENCE EDWARD SKINNER,
M. D., LL. D., NEW HAVEN, CONN.

Probably no event since the discovery of the value of antiseptics has attracted so much attention, from both medical men and laymen, as the discovery of the power of the x-ray to overcome cancer. The announcement of the fact was first met by derisive incredulity; next by an unwilling admission that beneficial results had certainly been observed simultaneously with the administration of x-ray treatments to sores that seemed to be cancerous; and finally, before an overwhelming mass of clinical demonstration, skepticism has given way to amazed conviction.

It is not difficult to appreciate the incredulous attitude of the medical mind in this connection. From time immemorial cancer has ultimately destroyed seventy per cent or more of the total number of its victims, in spite of any measure that could be applied for its relief, surgical or medicinal, and whatever the stage of the disease at which it came under treatment. Probably no other disease, with the possible exception of pulmonary tuberculosis, has been looked upon with so much hopeless dread and horror. Therefore, when the statement was made that x-light, which had not been previously known as a therapeutical measure at all, would not only entirely remove this hitherto intractable condition in many cases, but would accomplish the result without even producing discomfort on the part of the patient, it is not strange that the tidings should be looked upon as altogether too good to be true.

The beginning of the twentieth century has been marked by the discovery of many wonderful and valuable things in nearly

*Read at the twelfth annual meeting of the American Electro-Therapeutic Association, at the Hotel Kaaterskill, Greene County, N. Y., September 2, 1902. From the Official Organ.

every department of industrial and professional activity. We are living in a period of marvelously rapid progress and achieving results, which, even ten years ago, would have been looked upon as hopelessly beyond the limits of human possibilities. The development of the x-ray in the treatment of cancer will go down to history as by no means the least of the discoveries of any age that have proved potent in the relief of human misery and in the saving of human life.

For the purposes of x-ray therapy, cancers need be divided into but two groups: those affecting the superficial soft tissues, and those involving the deep tissues and bones.

The observations of Chamberlain, Pusey, Morton, Williams, Snow, Allen, Montgomery, Schmidt, and many others, including the speaker, have proven beyond any possibility of doubt that external cancer is curable by x-rays as far as physical examination and subjective symptomatology can discover, in at least the very great majority of cases. Present statistics indicate that the proportion of cures will exceed ninety per cent.

In the second category are included malignant processes extending or existing more than half an inch below the surface of the skin. Most prominent in this group occur mammary cancer, uterine cancer, malignant processes affecting the intra-abdominal and intra-thoracic lymphatics, and bone cancers.

The efficacy of x-radiance in curing cases belonging in the first group is now so well established that the greatest interest in the matter centers upon the deeply seated growths, and I shall confine my remarks principally to personal observations upon thirty-three cases of this character which I have had under treatment during the past nine months.

I was first led to believe that deeply seated cancers might be amenable to x-

light by my conviction that the beneficial influence which the agent undeniably exercises upon superficial cancer is due to the x-ray vibrations acting upon the cell elements of the growth, which elements are too weak and lacking in vitality to reach maturity and become the specialized tissue for which they were destined of themselves, in such a way as to give them new vitality, and hence ability to reach maturity and their normal ultimate structure. I have never considered the effect to be due to ozone formation, electrification or electrolysis of the elements of the growth, the deposition of any acid upon the sore, or any other of the several explanations which have been advanced to the exclusion of a specific influence of x-light. We have used all these agents before, but they did not cure cancer until x-light came upon the scene.

With a good high-vacuum tube, one that forces back a spark-gap of not less than four inches, rays can be produced that penetrate clear through the body; hence a malignant growth in their path could not fail to be influenced by them, if x-light is capable of exerting influence. It was under the impulse generated by these thoughts that the study of the following cases was undertaken.

In order that the conclusions to be drawn from the observation of these cases, and to be stated later, may be grasped intelligently, it is necessary that the important points in each case be brought to view. The time at my disposal, however, will permit of but the briefest possible description, and if anyone desires further light in connection with any case it will give me great pleasure to answer his queries.

(To be continued.)